

B.5 18 JANUARY 1973

The axis of the relatively flat upper long wave trough moved southeastward to a position over the southern Gulf on 18 Jan. Accordingly, the associated upper westerlies were displaced far enough southward to flow over southern Iran and the Strait of Hormuz. This is confirmed by the 500 mb analyses at 18/00Z and 18/12Z (Figures B-19 and B-21) and the DMSP visible satellite image near noon local time on 18 Jan (Figure B-23). Wave clouds downstream of the Hajar Mountains of the Oman Peninsula appear at right angles to this moderately strong upper flow at area I on Figure B-23.

The 18/00Z surface chart, Figure B-20, indicates a recently-formed surface trough with central pressure of 1011 mb over the Arabian Sea; the trough extends back into the Gulf of Oman and along the eastern shore of the Persian Gulf. It appears that the trough over the Gulf of Oman was induced by a combination of concave terrain effects* (Figure B-24) and upward motion associated with positive vorticity advection (vertical motion) to the east of the 500 mb long wave upper trough axis (Figures B-19 and B-21). Evidence of a weak vortex appears in cloud pattern J on the local noon DMSP visible image, Figure B-23. The vortex is also reflected in the surface analysis, Figure B-20, near 21°N, 63°E.

*See Godev, 1970 1971.

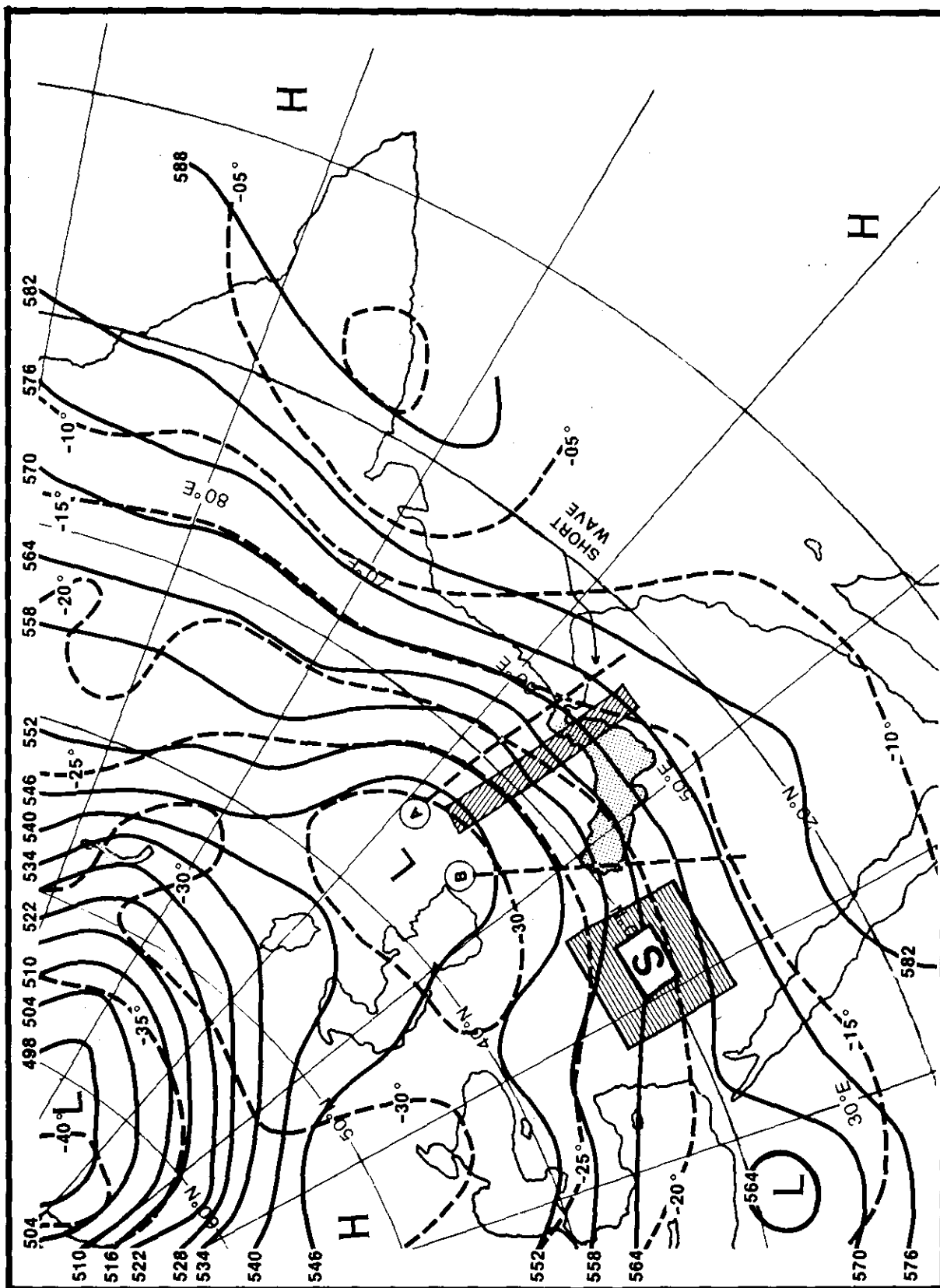


Figure B-19. 500 mb analysis, 18 Jan 1973 0000Z.

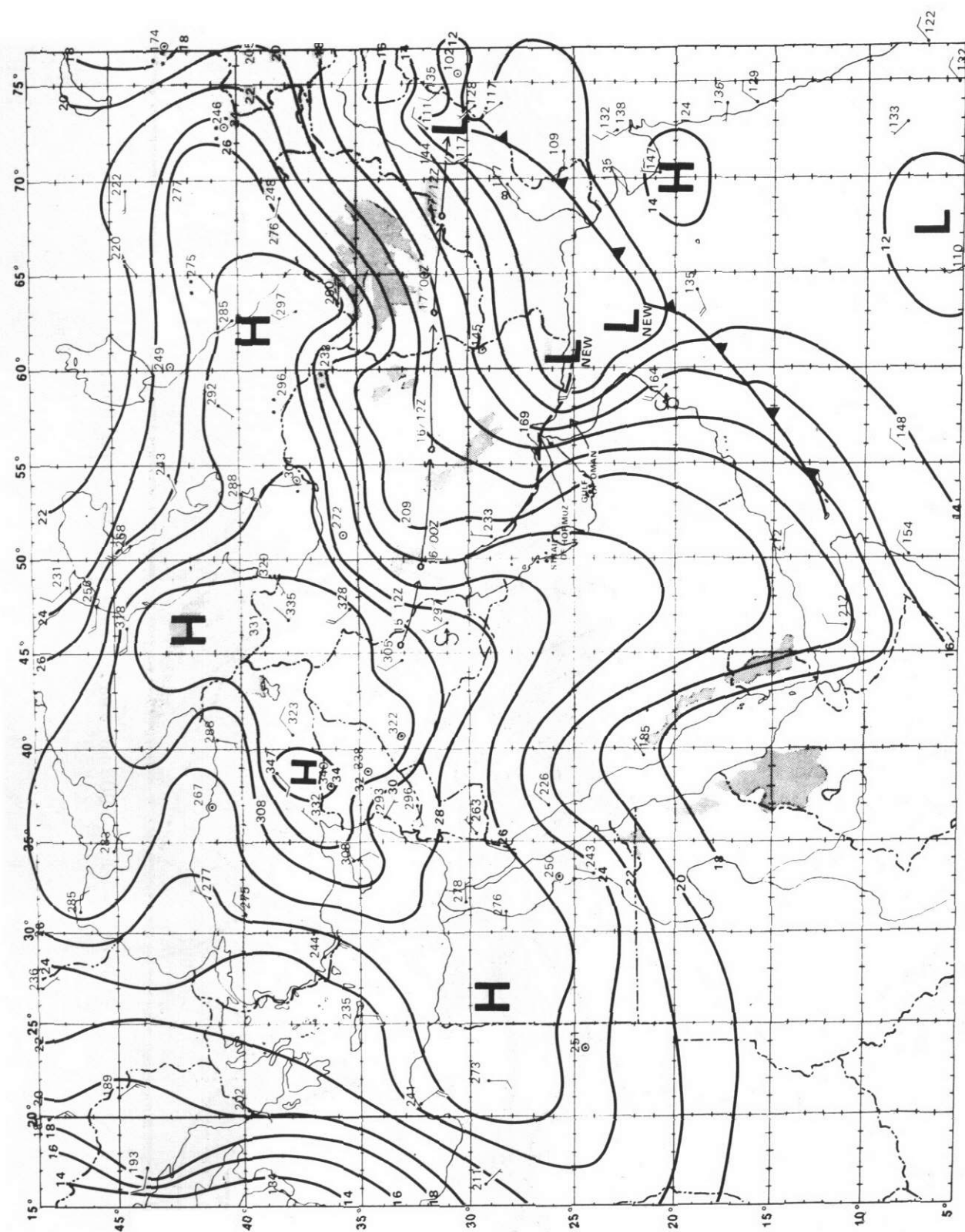


Figure B-20. Surface analysis, 18 Jan 1973 0000Z.

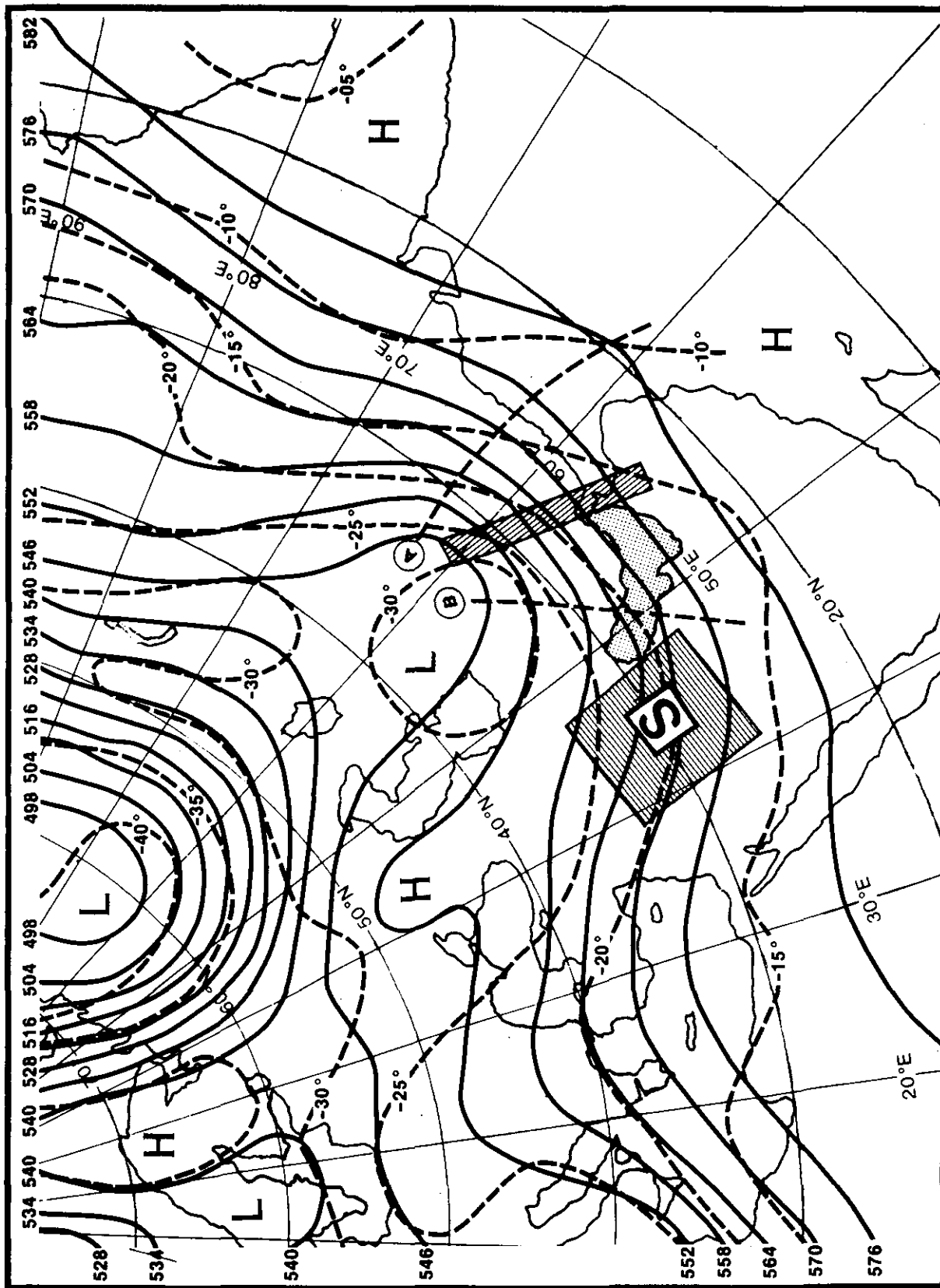


Figure B-21. 500 mb analysis, 18 Jan 1973 1200Z.

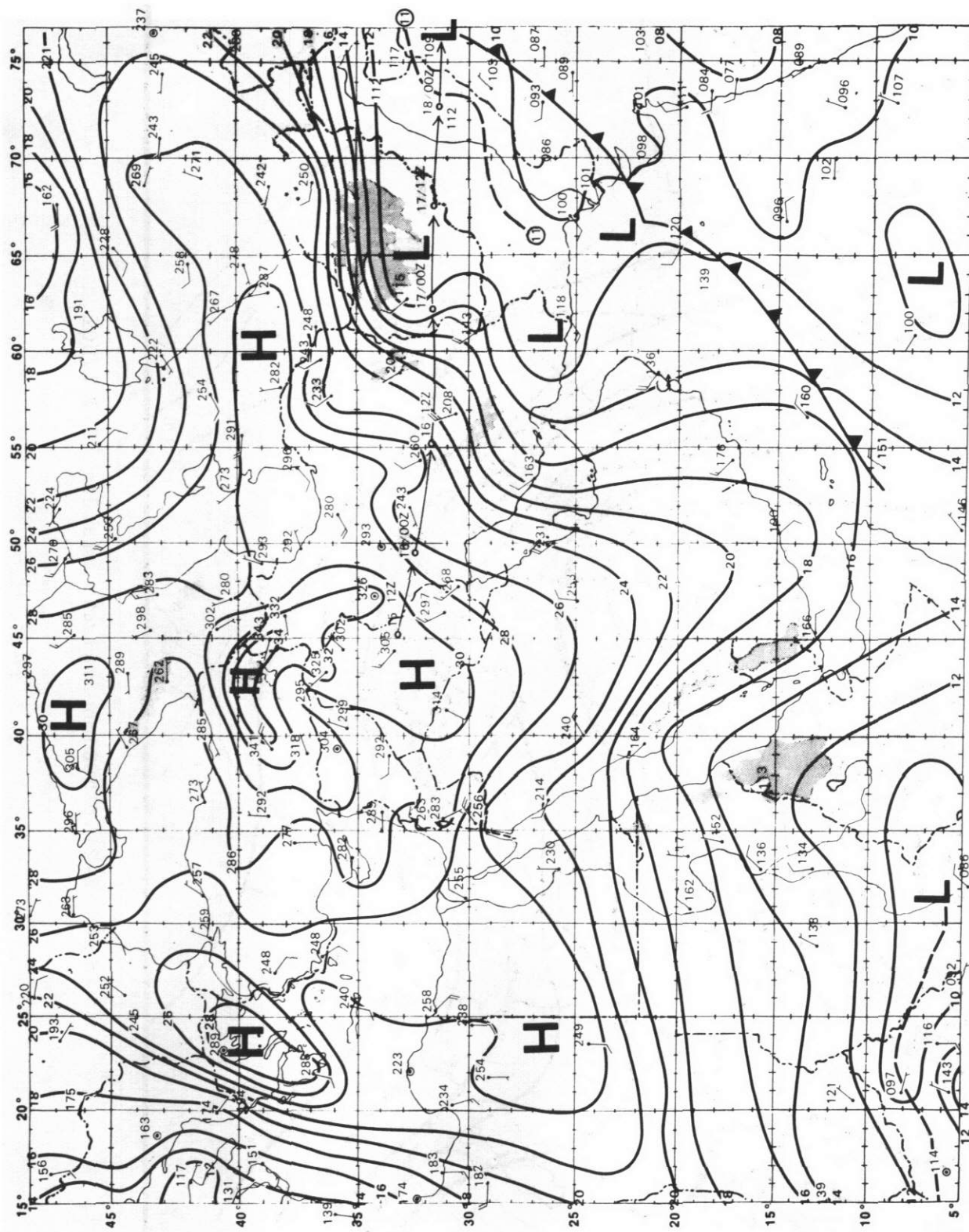


Figure B-22. Surface analysis, 18 Jan 1973 1200Z..

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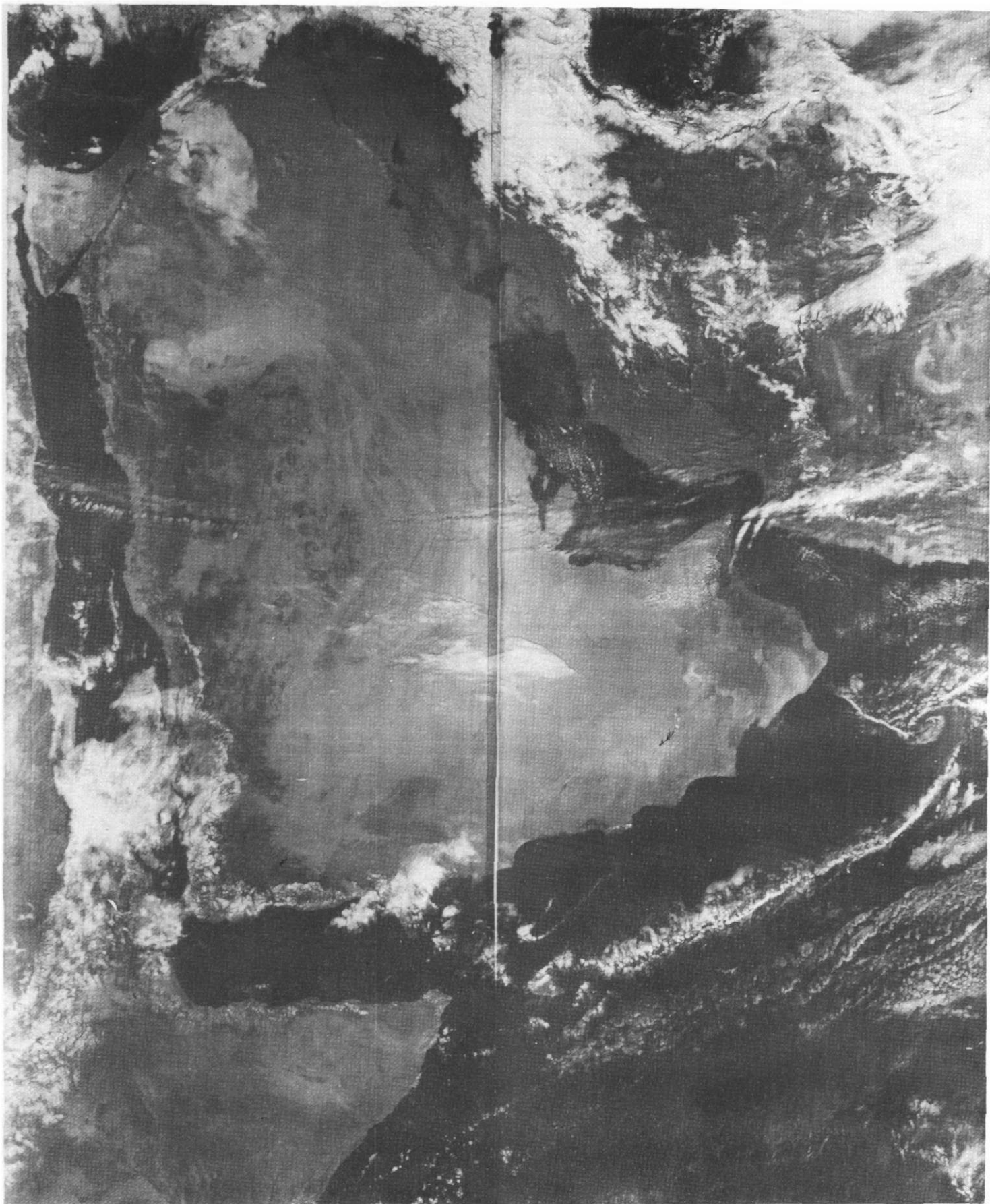


Figure B-23. DMSP visible image, 18 Jan 1973 local noon.

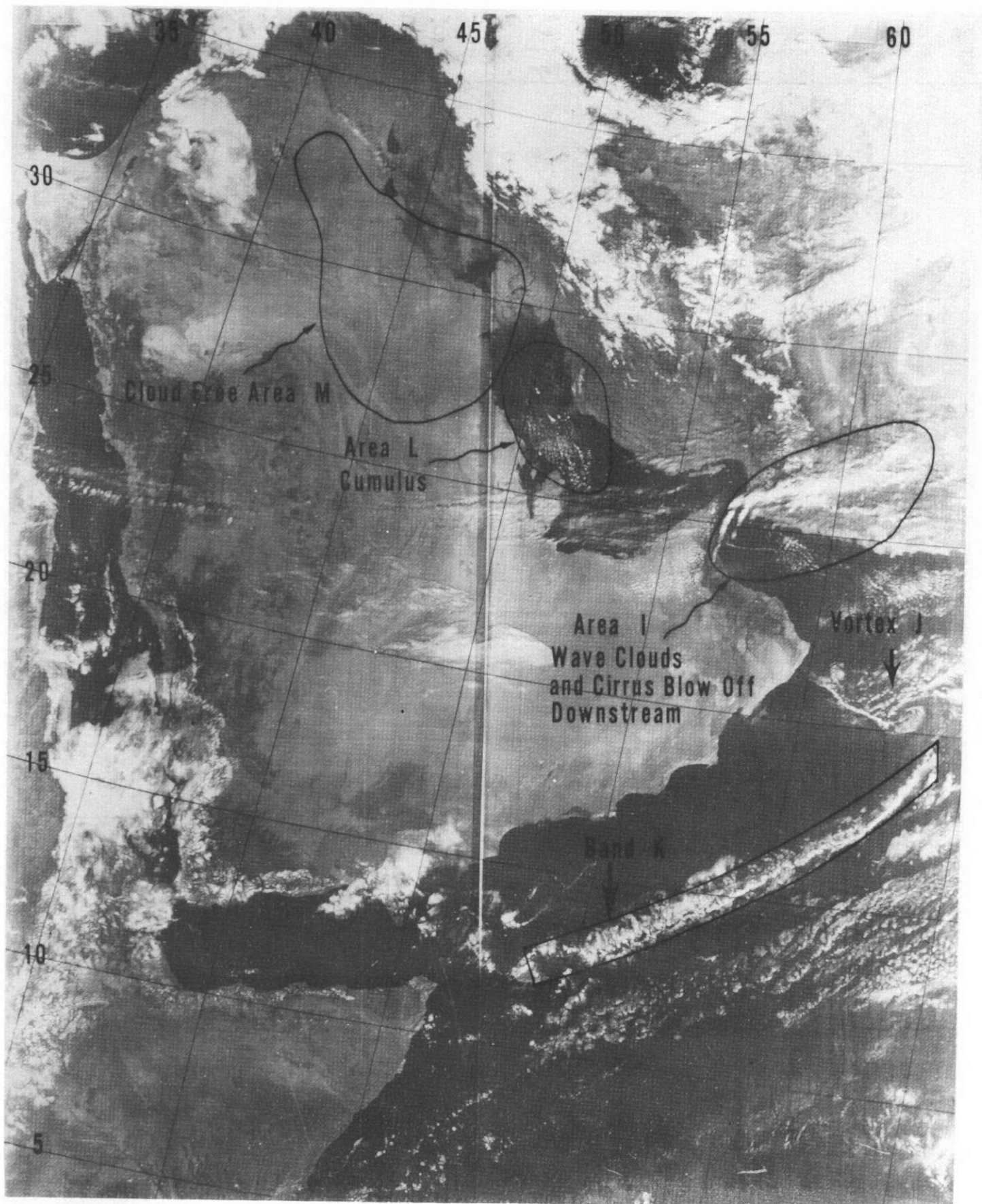


Figure B-23. Continued.

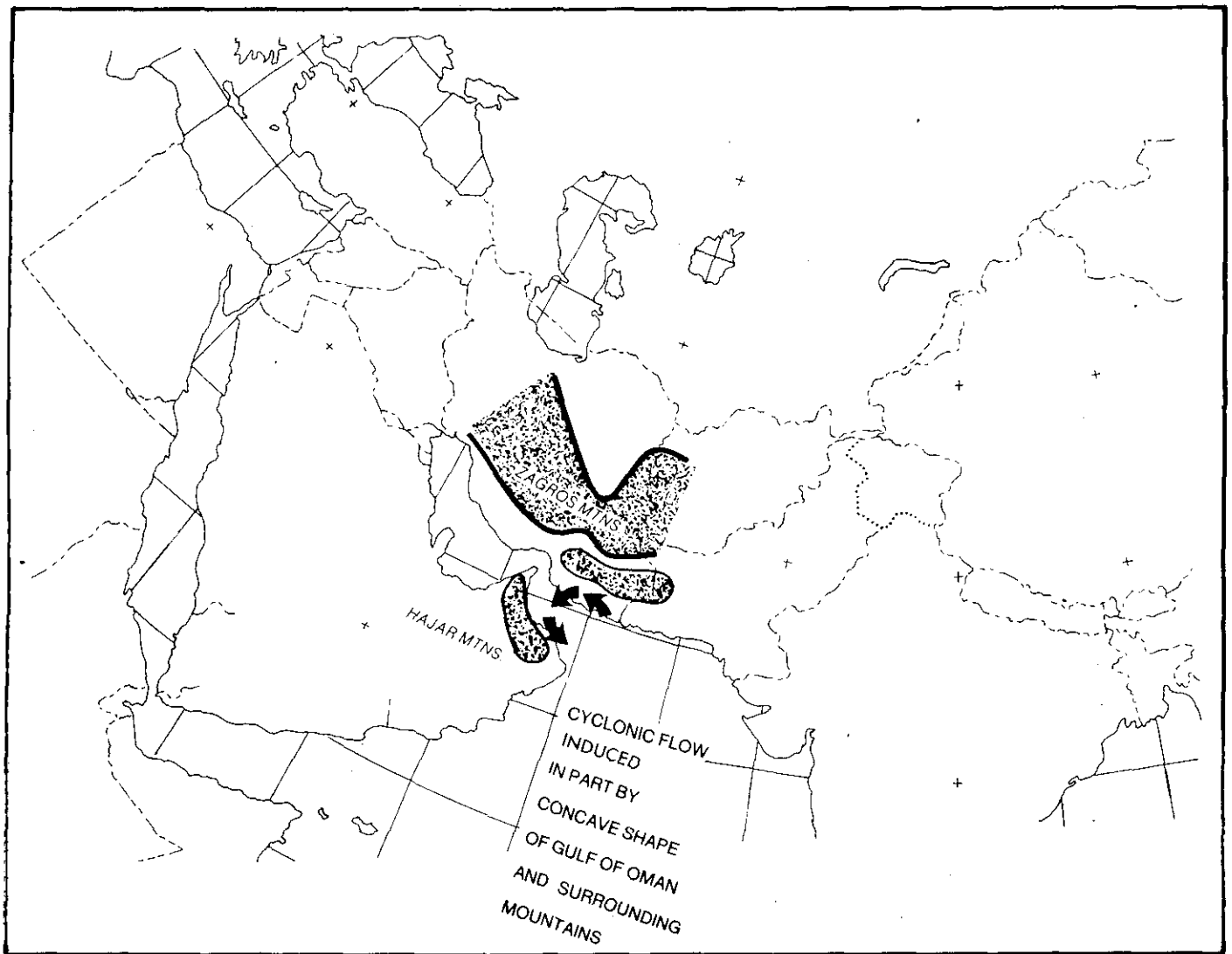


Figure B-24. Cyclonic surface circulation in Gulf of Oman induced by Gulf's concave shape and surrounding mountains.

Of the many short waves that moved through the long wave trough position, two are of particular interest (see 500 mb analyses, Figures B-19 and B-21). Short wave A on Figure B-21, to the east of the long wave position, is associated with vortex J over the Arabian Sea. Also associated with the vortex is band K on Figure B-23, the frontal rope structure. This cloud structure lay just off the Arabian coast on 17 Jan and then became more fully organized and lay further east in the Arabian Sea on 18 Jan. This structure is indicated as a weak cold front on the 18/00Z and 18/12Z surface analyses, Figures B-20 and B-22.

Short wave B on Figure B-21, to the west of the long wave position, is associated with freshly-formed cumulus convection over the northern and central Persian Gulf (area L in Figure B-23). The northwest-southeast orientation of the cumulus lines confirms the continued northwesterly flow in the lower levels over the Gulf.

A 6-8 mb surface pressure gradient oriented northwest-southeast was maintained between the Gulf of Oman and the northern Persian Gulf. Forecasting experience in the region indicates that such a pressure gradient is more than sufficient to sustain a gale force shamal, particularly in the southern Persian Gulf.

Well to the rear of the upper air trough axis, sinking motion occurred in the lower troposphere over northern Saudi Arabia, Iraq and Syria. This motion is indicated by the clear area labeled M on the visible image, Figure B-23; and by an S, for sinking motion, on the 500 mb analyses, Figures B-19 and B-21).

The central surface pressures near the surface high centered over Iraq rose at least 4 mb in 24 hr (computing 24 hour surface pressure changes takes diurnal surface pressure variations into account). This increase occurred at both 00Z and 12Z on 18 Jan (Figures B-20 and B-22), compared with the same time charts on 17 Jan (Figures B-15 and B-17).